Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (Currently Amended) A method for Viterbi decoding comprising:

receiving a sampled signal;

making a hard decision on which constellation point the sampled signal represents thereby creating a hard decision point;

determining a scaling factor (k) corresponding to the hard decision point; and

providing the scaling factor (k) and the hard decision to a Viterbi decoder,

wherein determining a scaling factor (k) corresponding to the hard decision point comprises:

selecting a first constellation point corresponding to the hard decision point;

determining a second constellation point corresponding to a nearest constellation point having the designated received bit; and

assigning a scaling factor value dependent on the number of constellation points between the first constellation point and the second constellation point.

2. (Original) The method as in claim 1 wherein making a hard decision on which constellation point the sampled signal represents comprises choosing a constellation point which is the closest Euclidean distance to the received sample signal.

3. (Cancelled)

4. (Currently Amended) The method as in claim [[~~3~~]]1 wherein comparing the designated received bit to the hard decision to compute the scaling factor comprises reading the scaling factor from a look up table.

5. (Original) The method of claim 4 wherein reading the scaling factor from a look up table further comprises:

using the designated received bit and the hard decision to index into a look up table; and

reading the scaling factor from the look up table.

6. (Currently Amended) The method as in claim [[~~3~~]]1 wherein comparing the designated received bit to the hard decision to compute the scaling factor comprises:

selecting a transition for which the scaling factor will be determined, thereby determining a selected transition;

determining a designated received bit that will result in the selected transition; and

comparing the designated received bit to the hard decision to compute the scaling factor.

7. (Original) The method of claim 6 wherein assigning a scaling factor dependent on the number of constellation points between the first constellation point and the second constellation point comprises:

assigning a value of zero to the scaling factor if the first constellation point is equal to the second constellation point;

assigning a value of 1 if the first constellation point is adjacent to the second constellation point; and

assigning a value of 2N+1 if the first constellation point is separated from the second constellation point by N constellation points.

8. (Original) The method as in claim 1 wherein determining a scaling factor (k) corresponding to the hard decision point further comprises:

determining a first scaling factor dependent on the location information of the hard decision;

determining a second scaling factor dependent on the signal to noise ratio of the channel; and

combining the first scaling factor with the second scaling factor to produce the scaling factor k.

9. (Currently Amended) An apparatus for decoding a signal, the apparatus comprising:

means for receiving a sampled signal;

means for making a hard decision on which constellation point the sampled signal represents;

means for determining a scaling ~~sealing~~ factor (k) corresponding to the hard decision points; and

means for providing the scaling factor (k) and the hard decision to a Viterbi decoder,

wherein determining a scaling factor (k) corresponding to the hard decision point comprises:

selecting a first constellation point corresponding to the hard decision point;

determining a second constellation point corresponding to a nearest constellation point having the designated received bit; and

assigning a scaling factor value dependent on the number of constellation points between the first constellation point and the second constellation point.

10. (Original) The method of claim 8 wherein the means for determining the scaling factor (k) corresponding to the hard decision point further comprises:

means for determining a first scaling factor dependent on the location information of the hard decision;

means for determining a second scaling factor dependent on the signal to noise ratio of the channel; and

means for multiplying the first scaling factor to the second scaling factor to produce the sealing factor (k).

11. (Original) A method of signal decoding comprising:

accepting a received signal;

quantizing the received signal to a point in a signal constellation plane, to provide a quantized point;

making a hard decision as to which constellation point the quantized point represents;

determining scaling factors (k's) associated with each constellation point;

using the scaling factors and hard decision point to determine decoder metrics; and

providing a decoder metrics and quantized point to a Viterbi decoder.

12. (Original) The method of claim 11 wherein making a hard decision as to which constellation point the quantized point represents comprises:

determining which constellation point is closest to the quantized point; and

assigning a value of the nearest constellation point to the quantized point.

13. (Original) The method of claim 12 wherein determining which constellation point is closest to the quantized point comprises:

computing a Euclidean distance squared between the quantized point and the candidate constellation point; and

selecting the constellation point with the smallest Euclidean distance squared as the closest constellation point.

14. (Original) The method as in claim 13 wherein selecting the constellation point with a smallest Euclidean distance squared comprises:

(a) squaring an X direction distance between the quantized point and the candidate constellation point to provide a squared X direction distance;

(b) squaring a Y direction distance between the quantized point and the candidate constellation point to provide a squared Y direction distance;

(c) adding the squared X direction distance to the squared Y direction distance to find a Euclidean distance squared;

(d) repeating steps a, b and c for all candidate points;

(e) selecting the candidate point with a smallest Euclidean distance squared.

15. (Original) The method as in claim 11 wherein determining the scaling factors associated with each quantized point comprises:

determining an amount of noise necessary to create an error in a candidate bit; and

assigning the scaling factor in proportion to the amount of noise necessary to create an error in a candidate bit.

16. (Original) The method of claim 11 further comprising:

multiplying the scaling factors times a signal to noise ratio (SNR) scaling factor to provide a scaled SNR result; and

using the scaled SNR result to determine the decoder metrics.

17. (Original) The method of claim 16 wherein using the scaled SNR result to determine the decoder metrics comprises:

using the results as an index into a branch metric table; and

reading the metric associated with the index.

18. (Original) An apparatus comprising:

an input for accepting a received signal;

a quantizer that accepts the received signal from the input and quantizes the input to a point in a signal constellation plane, to provide a quantized point;

a hard decision unit that accepts the quantized point and determines a constellation point that the quantized point represents;

a scaling factor unit that determines scaling factors associated with the constellation point; and

a metric calculator that accepts the scaling factors and the constellation points and determines branch metrics for the constellation points.

19. (Original) An apparatus of claim 18 further comprising:

a Viterbi decoder that accepts the constellation points and the branch metrics and produces decoded bits.

20. (Original) The apparatus of claim 18 wherein the metric calculator comprises:

an input that accepts a signal to noise ratio (SNR);

an input that accepts scaling factors; and

a combination circuit that combines the scaling factors and SNR to create a branch metric